DOCUMENT RESUME

ED 438 777 IR 019 902

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TITLE	An Assessment of Technology Classroom Environments in Chinese Universities.
PUB DATE	1999-11-00
NOTE	30p.; Paper presented at the annual meeting of the Mid-South Educational Research Association (28th, Point Clear, AL, November 17-19, 1999).
PUB TYPE	Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	Adult Education; Chinese; Computer Literacy; *Educational Environment; Educational Needs; Educational Technology; Foreign Countries; *Graduate Students; Graduate Study; Higher Education; *Social Environment; *Student Attitudes; *Teacher Attitudes; *Technology Education
IDENTIFIERS	China

ABSTRACT

Technology education has been listed as a new basic requirement in the curriculum for graduate students at universities and colleges in China for seven years. The purpose of this study is to explore Chinese graduate students' and teachers' perceptions about the technology class--what these students consider to be helpful and what they perceive to be their greatest needs. Findings are discussed according to research questions that examined whether there existed differences in perceptions of the social environment of adult technology classrooms according to age, gender, major, and prior work experience. Also examined were differences in the ideal and actual social environments of adult classrooms as perceived by the students, and differences between Chinese and American students and teachers, in their views about the social environment of adult classrooms. (Contains 46 references.) (AEF)

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ED 438 777

AN ASSESSMENT OF TECHNOLOGY CLASSROOM ENVIRONMENTS IN CHINESE UNIVERSITIES

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A paper presented at the annual meeting of the Mid-South Educational Research Association, Point Clear, Alabama, November, 1999

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INTRODUCTION

With the policy of opening up and reforming the nation, including new policies for educational reform in China, China's educational system has changed significantly (Chafy, 1997). The number of graduate students in China has increased greatly since 1978 when China resumed entrance examinations for graduate students. According to officials (Xie, 1997) with the State Education Commission (SEC), nearly 350,000 people have earned Master's degrees and about 23,000 have earned Doctorates in the last two decades. Annually, 41,000 candidates for Master's degrees and 800 candidates for Doctoral degree are admitted by Chinese universities and colleges. With the rapid progress that has been made in science and technology education, universities and colleges in China have dramatically altered their curricular requirements so that technology courses have become required for all undergraduate and graduate students (Shen, & Zhang, 1991). These new technology courses are supposed to help prepare students to meet technology requirements in the workplace. While seven years have passed since the technology courses were first required for both undergraduate and graduate students in China, little research has been conducted on the way these technology courses have been implemented. A study on the effects of technology courses in graduate studies in China is needed. Specifically, knowledge of the classroom learning environments that exist in these courses may answer many questions about the implementation process.

Research on the influence of classroom environment on learning has been completed for 30 years in some western countries, such as the United States, Australia, Canada, England, Israel, and Nigeria (Fraser, 1989). Major syntheses of research on the learning environment in classrooms (Fraser & Treagust, 1986) clearly indicate that selected learning environment characteristics demonstrate incremental validity in predicting students' achievements, are useful in curriculum evaluation studies, and can provide teachers with important information to improve classroom environment characteristics. The research also shows that learning environment assessment can be cross-culturally replicated.

Purpose of the Study

Technology education has been listed as a new basic requirement in the curriculum for graduate students in universities and colleges in China for seven years (Shen, & Zhang, 1991). It is hoped that technology education will play an important role in preparing students to understand, adapt to, and

compete in an ever-increasing technological and global marketplace. But has technology education achieved such a function? Research has shown that graduate students need technology education desperately (Yu, Feng, Zhang, & Tao, 1990). Research has also revealed that many factors affect graduate students' grasp and use of technology, but, little research of the social environment of graduate classrooms, one of the most important factors, has been undertaken (Darkenwald, 1989). The purpose of this study is to explore graduate students' and teachers' perceptions about the technology class: what graduate students consider helpful and what they perceive to be their greatest needs. The results of the study should be useful in guiding the pedagogy and teaching styles of teachers in China.

Research Questions

Seven questions were addressed in this study: 1) Are there differences in the Ideal and Actual social environments of adult classrooms as perceived by the Chinese graduate students in technology classes? 2) Are there differences in the perceptions of the Chinese graduate students and those of the faculties regarding the social environment of adult technology classrooms? 3) Are there differences between Chinese graduate students in two age groups in their perceptions of the social environment of adult technology classrooms? 4) Are there differences between the male and female Chinese graduate students in their perceptions of the social environment of adult technology classrooms? 5) Are there differences between the Chinese graduate students of science and liberal arts majors in their perceptions of the social environment of adult technology classrooms? 6) Are there differences between the Chinese graduate students who have work experiences and those who do not have any work experiences in their views about the social environment of adult technology classrooms? 7) Are there differences between the Chinese graduate students and teachers and American students and teachers in their views about the social environment of adult classrooms?

REVIEW OF RELATED-LITERATURE

In the last thirty years, the effect of classroom environments has been an important topic for researchers and educators. Many researchers and educators have made a great contribution to the theory building and study on the topic. Among them, there are three names often appearing in the studies about classroom environments. They are Herbert Walberg, Rudolf H. Moos, and Gordon G. Darkenwald.

Walberg's Learning Environment Inventory

Walberg is the researcher who developed the first instrument with Anderson (Walberg, 1968) that measured learning environment. Walberg found that the observation method was inferior to surveys with questionnaires, because the observers often missed something happening in a certain environment in only a few observations, and the information from the participants made the data more reliable (Moos, 1980). Therefore, when he was asked to do an evaluation of the learning environments in physics classroom for Harvard Physics Project, he developed the Learning Environment Inventory (LEI), which asked students for their perceptions of the whole-class environment. Later he developed My Classroom Inventory (MCI), a simplified form of LEI. From then on, development of perceptually-oriented measures of classroom environment have become a priority (Moos, 1980).

Moos's Classroom Environment Scale

Rudolf H. Moos is widely recognized as a foremost authority in the area (Moos, 1980). Moos used Lewin's and Murray's paradigms to explain the environmental factors that influence individuals to manifest effective and ineffective behavioral responses in particular social settings (Darkenwald, 1987). His research has contributed a great deal to the conceptual framework of classroom environment research (Darkenwald, 1987).

As a professor of ecology, Moos has been engaged in the studies of the social environments for many years. After studying in different social settings, he concentrated his research on the social environments of junior high and high school classrooms. Moos (1980) found that the socio-ecological system influences both the teacher's behavior and students' learning. Moos (1980) stated that a classroom environment as a dynamic social system does not only include the teacher's behavior and teacher-student relationship, but also student-student interaction. Moos (1980) defined the classroom environment as "the shared perceptions of the people in that environment" (1980, p. 240). He also asserted that classroom environmental factors influence an individual's behavioral responses (Darkenwald, 1987).

Moos (1979) identified three theoretical domains in the classroom. The first was the Relationship Domain, covering students' involvement in the learning setting, their support of one another, and the freedom with which they express themselves. The second domain, the Personal Growth or Goal

Orientation Domain, represents students' personal development. The third is the system Maintenance and Change Domain, including the order and organization within the classroom. The subconcepts identified by Moos are involvement, affiliation, teacher support, task orientation, competition, order and organization, rule clarity, teacher control, and innovation. Moos (1980) concluded from his research that environments consisting of warm, supportive relationships and high expectations lead to more effective student behavior and learning. Such environments are organized and emphasize definite academic tasks and clear directions (Brown, 1991; Hirst & Bailey, 1983; Halpin, 1990).

Research on classroom social environments in schools has consistently revealed that the Classroom Environment Scale and similar scales explain much of the variance in the effects of the environments on student behavior (Walberg & Moos, 1980). Studies of classroom social environments in higher education are scarce; however, they support the findings from research in elementary and secondary schools. Fraser and Treagust (1986) conducted a study of classes in Australian universities and found that a more agreeable classroom social environment was favored by both the students and the instructors. The study also indicated that instructors have a more positive view of the classroom social environment than do their students.

Darkenwald's Adult Classroom Environment Scale

Perceiving that most prior research had focused on elementary and secondary school classrooms, Darkenwald (1987) felt that an instrument was needed for assessing the adult classroom social environments. Working with Gavin and other doctoral students at Rutgers University, Darkenwald developed the Adult Classroom Environment Scale (ACES) on the basis of Moos' CES. This instrument was welcomed by adult educators and is quite widely used.

Ever since Knowles (1980) introduced the concept of "climate," adult educators have been describing how to provide an appropriate environment for adult learning. Because it is widely believed that teaching adults is different from teaching children and adolescents, many prescriptions exist for structuring the adult learning environment to take into account these differences. However, when Darkenwald and Gavin (1987) tried to measure the classroom environment preferred by adults, they found that none of the instruments which were widely used took the characteristics of adult learners into

consideration. Even Moos' CES, which had a solid conceptual framework, was questioned in terms of its validity as a tool for conducting research on social environment for adults in educational settings.

While taking social environment/climate theory, social ecology, and person-environment fit as the theoretical basis for his scale, Darkenwald also applied Lewin's (1935) field theory and Murray's work on needs-press (1938) in developing the scale. Moos' social environment paradigm became the essence of Darkenwald's new scale. In Moos' paradigm, teacher behavior, teacher-student interaction, and student-student interaction are important. Their interactions serve as the basis of the social environment, or climate of the classroom.

Considering the results of his own study, and taking CES of Moos as a basis of his ACES, Darkenwald identified seven dimensions, with seven items in each dimension. Darkenwald (1987) described the dimensions as1) involvement-the extent to which students are satisfied with class and participate actively and attentively in activities (e.g., most students take part in class discussions), 2) affiliation-the extent to which students like and interact positively with each other (e.g., students in class work well together), 3) teacher's support-the extent of help, encouragement, concern, and friendship that teacher directs toward students (e.g., teacher encourages students to do their best), 4) task orientation-the extent to which students and teacher maintain focus on task and value achievement (e.g., teacher seldom talks about things not related to the course), 5) personal goal attainment-the extent to which teacher is flexible, providing opportunities for students to pursue their individual interests (e.g., teacher tries to find out what individual students want to learn), 6) organization and clarity-the extent to which class activities are clear and well organized (e.g., teacher comes to class prepared) and 7) student influence-the extent to which teacher is learner-centered and allows students to participate in course planning decisions (e.g., teacher rarely dominates classroom discussion). Two forms of the ACES were developed. One, the Actual, was designed to measure the actual or "real" environment; the second, the Ideal, measured the preferred or "ideal" environment. A brief discussion of each dimension follows.

Involvement. Astin (1985) defined student involvement as the amount of physical and psychological energy that the student devotes to the academic experience. A synthesis of studies done in the last twenty years demonstrated the strong relationship between student involvement and student achievement. An important finding in these studies was that the amount and quality of participation in

learning activities was an important determinant of student achievement in college (Friedlander, 1980, 1990; Pace, 1982, 1984). Research demonstrates that the amount of information learned and retained is greater if the student is not passive, but rather actively involved in the learning process interpreting, comparing, analyzing, synthesizing and using higher order thinking processes (Johnson & Johnson, 1989). McKeachie (1988) stated that student participation, teacher encouragement, and student-to-student interaction are three activities that positively related to improved critical thinking. These activities stress the importance of active practice, motivation, and feedback in fostering critical thinking as well as other skills. Discussions and dialogues, especially in small classes, have much more impact on improving critical thinking and problem solving than lectures.

Affiliation. Tebben (1995) defined affiliation as feeling a part of the group in class, and feeling a part of the group as being accepted by other students in the class and having opportunities to help each other. Tebben (1995) found that most students consider affiliation in the classroom to be important to their learning. To avoid feeling isolated or alone, students must develop reciprocal relationships, and they must be able to identify themselves as members of a large group. The sense of caring and belonging is often threatened in classrooms where students are forced to compete against each other (Raffini, 1993). Johnson, Johnson, and Scott (1993) claimed that if the students like the teacher and the classroom, the instructional climate of the classroom will be more effective and the students will be motivated to achieve learning goals. College instructors should, therefore, create a classroom in which collaborative and cooperative learning takes place. Johnson and Johnson (1984) promoted the use of cooperative learning techniques to increase achievement, improve student attitudes toward the subject area, enhance self-esteem, and increase student collaborative capabilities. Lowman (1984) found that students need the approval of classmates so that they feel learning is much more satisfying. Noddings (1988) defined a classroom dedicated to caring as encouraging students to support each other, providing opportunities for peer interaction, and taking the quality of that interaction as important as the academic outcomes. Teaching strategies, such as group activities, peer tutoring, student-led discussions, and classroom debates help create an environment in which there is interdependence of group members working toward a common goal (McKeachie, 1994).

Teacher Support. While both involvement and affiliation are in the domain of student-student relationship, teacher support, Darkenwald's (1989) third dimension of ACES, assesses students' perceptions of their interactions with teachers. Guskey (1988) found that highly effective teachers demonstrate positive regard for students, promote active student participation in the classroom through questioning, and communicate a sense of enthusiasm about their subjects. A review of literature by Murray (1991) noted teacher enthusiasm and teacher-student interaction exhibit the most consistent relationship to instructional outcomes. Perry (1991) found that expressive instruction increased student achievement and that expressive instruction increased student motivation and attendance in his extensive research on teacher effectiveness and student achievement. Lowman (1984) found that student learning outcomes were more satisfying when students were sure the teachers were interested in and trusted them, and that teacher enthusiasm was a substantial factor in student satisfaction with classes. Karabenick and Sharma (1994) found that teacher support has significant and consistent relationships with students' motivational tendencies, and teacher support affect the likelihood of student questioning. They concluded that creating opportunities for questions and providing high quality answers are important dimensions of teacher support. The more the teacher is supportive, the more questions are generated, and the more active the learning is, the more the students learn.

Task Orientation. Task orientation is important in encouraging cognitive growth for students participating in personal development classes, and the emphasis placed on task and objectives will increase the persistence of students, especially adult learners, who have clear career-, job- and life-related purpose (Fujita-Starck & Thompson, 1994). Effective teaching and satisfying outcomes of students may occur when the teacher helps students understand the content of the course (Rosenshine, 1995; Check, 1984). Task orientation is characterized by teacher support (Moos, 1980). All seven items measuring the task orientation dimension tap aspects of teaching (Darkenwald, 1989).

Personal Goal Attainment. Goals are what individuals hope to achieve and accomplish. Such intentions motivate and direct human behavior (Stark, & others, 1989). Thus, educational outcomes such as academic satisfaction, use of appropriate learning strategies, effort exerted in course work, and ultimately, academic achievement, are related to goals. Fujita-Starck and Thompson (1994) found in their study that the extent to which students can pursue individual goals is one of the essential ingredients for

satisfying learning experiences. During discussions about higher education quality, activities such as promoting active involvement in learning, stating clear expectations, and assessing educational results have taken on increased importance for colleges and universities attempting to improve their programs. Yet in each of these activities, understanding students' educational goals is important to ensure success (Stark & others, 1989). Helping students take active responsibility for their education, for example, may depend on how well educators match the classroom goals they set for their students with the goals that students hold for themselves. Communicating clear expectations for students depends, in part, on understanding discrepancies between expectations instructors establish and those students accept as consistent with their own goals. In addition, an accurate assessment of student outcomes fostered by the college experience should take into account students' educational goals as well as their academic preparation (Stark & others, 1989). Personal goal attainment is even more important in adult learning (Knowles, 1980). Adult learners have explicit goals, which have a real-life orientation (Knowles, 1980). Therefore they take personal goal attainment as an important indicator of a desired classroom environment.

Organization and Clarity. After doing a thorough evaluation of over 220 articles dealing with student views of the "superior teacher," Feldman (1988) identified 19 characteristics of the superior teacher. Among these traits are clarity, stimulation of interest, knowledge of subject mater, organization, enthusiasm for subject matter. Teachers are expected to be able to explain things clearly, and to be well prepared with organized course materials. Based on Knowles' (1980) commonly cited assumptions about adult learners, adult learners are very much concerned with clarity of presentation, well- organized lectures, and classroom management (Ross, 1989). This concern may reflect adult students' desire to pursue learning goals in a time-efficient manner. They do not wish to see time wasted by disorganized instructors.

Student Influence. Broadened and deepened student influence is a means of achieving general central goals and a method of increasing the efficiency of the education (Larsson, 1990). Larsson (1990) also asserted that one purpose of adult education is for students to learn to plan and take responsibility for their studies, in choosing forms of work and educational materials and in their evaluation. Students' influence can be seen in terms of time, student views of teaching and their self-confidence.

Summary

Walberg and his colleagues carried out studies on classroom environment from qualitative research to quantitative research, which more reliably explained classroom environments (Moos, 1980). Moos (1979) has conducted research which contributed greatly to the conceptual framework of classroom environment research. Darkenwald made a contribution to adult education with his Adult Classroom Environment Scale.

METHODS

Population

The population for this study consisted of the graduate students enrolled in technology classes in the universities and colleges in Beijing during the Fall Semester 1998. Among sixty-one universities in Beijing, thirty-nine of them have graduate programs, including seventeen key universities that have more funds from the government and enroll outstanding students (Chafy, 1997), and twenty-two regular universities that have less funding from the government and enroll students with relatively lower scores in university entrance examinations.

Sample

The sample for the study was selected utilizing stratified random sampling. The universities and colleges in Beijing are quite different in size, and are divided into Key Universities and Regular Universities. The sample consisted of one large key university with more than 500 graduate students, one medium-sized key university with 300 to 500 graduate students, one small key university with fewer than 300 graduate students, one large regular university with more than 90 graduate students, one medium-sized regular university with 50 to 90 students, and one small regular university with fewer than 50 graduate students. These institutions were selected randomly from each stratum formed by cross-classifying institutions according to school "type" and size. A systematic selection process and a random number method were used in selecting classes within institutions. The even-numbered classes were selected. The sample size was 335, including 327 graduate students and 8 teachers. There were 108 in two classes from Chinese People's University (large key university), 75 in two classes from Beijing Normal University (medium-sized key university), 81 in one class from Chinese Agricultural University (small key university), 23 in one class from Chinese Mineral University (large regular university), 21 in one

class from University of International Business and Economics (medium-sized regular university), and 19 in one class were from Beijing Business University (small regular university). All graduate students in the eight classes were asked to complete the survey questionnaire. Ten of the returned questionnaires with missing data were taken out when the data were analyzed.

Instrumentation

The Adult Classroom Environment Scale (ACES) was chosen for use in this study with the permission of the author. Both the Ideal(I) and the Actual(A) forms were used. Form A is used to measure the "perceptions of real or enacted environment" (Darkenwald, 1987, p. 129). Form I reveals what the students perceive as their preferred classroom environment. All items were scored 1, 2, 3, and 4 respectively for the responses Strongly Disagree, Disagree, Agree, Strongly Agree, except for specific items designated (-). Fourteen of the items required reverse scoring. The scale items reflect students' and teachers' characteristics and interactions (Darkenwald, 1989). Their interactions reflect the social environment, or climate of the classroom. When Darkenwald (1987) developed the scale, he drew items from several sources. Sources included interviews with teachers of adults and adult students, similar instruments designed to measure environments for other populations, and the research team's ideas. The initial scale was reduced to 49 items on the basis of standard item-analysis procedures and feedback from respondents. The 49 items were divided into seven subscales, Involvement, Affiliation, Teacher Support, Task Orientation, Personal Goal Attainment, Organization and Clarity, and Student Influence.

The Adult Classroom Environment Scale (ACES) developed by Darkenwald (1987) has been very reliable. Cronbach's alpha was computed for each of the seven subscales and the full scale. The pilot test was conducted with 776 adult students and teachers from various settings. The Actual questionnaire was answered by 355 students and the Ideal questionnaire was answered by 375 students; 46 teachers completed the Ideal teaching questionnaires. Subscale reliabilities ranged from barely satisfactory (.58) to very high (.89). Full-scale reliabilities were all very high: .94, .93 and .90 for student Actual questionnaires, student Ideal questionnaires, and teacher Ideal questionnaires respectively. The content validity was supported by involving adult students, teachers of adult learning, and experts in adult education to produce the items. The procedure was systematic and thorough. Second, the discriminant

validity was proven by Darkenwald's assessment. The intercorrelations among the seven subscales were low enough to show that they could measure different aspects of the classroom environment.

Because the study concerned with Chinese graduate students' and teachers' perceptions of the classroom environment in technology courses, the survey was conducted in Beijing, China. In this particular setting, an ACES in the Chinese language was needed. In order to ensure the correctness of the translation, Dr. Huang, Chairman of the Chemistry Department of East Tennessee University, was asked to review the instrument and suggest changes. A Chinese graduate student was also asked to correct the translation. The final corrections yielded a final version that was acceptable to the reviewers. A pilot test was then conduced with the final Chinese Translation. Ten graduate students from Beijing Normal University were asked to answer the questionnaire in English first, and then the Chinese version. pilot test was completed two weeks earlier than the real survey. The data were analyzed with a paired-sample t test, which compared the answers in the English version with the ones in Chinese to see if there was any difference in their answers in the two conditions. The analysis failed to reveal a significant difference between answers in two conditions ($t(9) = 0.2$; $p > 0.05$). Therefore, responses on the two forms were deemed equivalent.

Data analysis

The graduate students' and teachers' responses were analyzed with two different statistical tests, the paired-sample t test, and a one-way analysis of variance (ANOVA). The paired-sample t test was used to measure the difference between the graduate students' perceptions in two conditions, the preferred classroom environment and the real classroom environment, and the difference between the perceptions of the graduate students and that of their teacher about the real graduate student classroom environment. ANOVA was used to measure the differences between types of graduate students and their perceptions of their classroom environment.

A series of t-tests for independent sample means were used to test for differences between the Chinese student ratings and the ratings of American students found in two previous studies. Where sample variances were not reported for the American sample, the Chinese variances were substituted so that the pooled variances independent groups t-test could be completed. All statistical tests were two-tailed and conducted using a 0.05 level of significance.

Data Collection

Data collection was completed during the thirteenth and the fourteenth weeks of Fall 1998. The ACES was administered to 8 teachers and 327 graduate students who were enrolled in the technology courses in eight classes in the six universities in Beijing. The procedure of administration was as follows: First a letter was sent to the administrator of the graduate school of each randomly selected university to get permission to do the survey. Two of the selected universities, Chinese Law University and Beijing Languages and Cultural University, declined the request because they had finished their technology courses, while the other four universities agreed to do survey. Therefore, two other universities were randomly selected. The administrators in those two universities agreed that a survey could be conducted in the graduate technology courses. Third, eight even-numbered classes in the four selected universities were selected. University of International Business and Economics and Beijing Business University had only one class; therefore the survey was administered in the only class in those two universities. The purpose of the study was explained to the instructors of the courses before the survey and explained the purpose and the procedure of the survey. Last, the administration of the ACES was conducted in the thirteenth and the fourteenth weeks of the Fall Semester 1998.

RESULTS

The sample was drawn from the eight classes in the six universities of different sizes and "types" in Beijing, China. The size of the sample was 325, including 317 graduate students and 8 teachers. The participants were asked to complete a demographic survey in which they reported their gender, age, major and work experience. The largest number of participants were drawn from the Chinese Peoples' University (108 or 34%, 2 teachers) and the Chinese Agricultural University (81 or 26%; 1 teacher). Other institutions included Beijing Normal University (67 or 21%, 2 teachers), Beijing Business University (19 or 6%, 1 teacher) , Beijing Mineral University (21 or 7%; 1 teacher), and University of International Business And Economics (21 and 7%; 1 teacher).

Age. Majority of the students in the sample were age 25 or below (180 or 59%). In two of the eight classes, there was only one group of participants, either 25 or below or over the age of 25. Hence those two classes could not be included in the hypothesis testing.

Gender. The majority of the student respondents were male (173 or 55%). In three of the eight classes, the frequencies and percentages of participants in the two gender groups are very different.

Major. The majority of the students were in science programs (183 or 58%), although a significant number (134 or 42%) were in liberal studies programs. In four of the eight classes, there was only one major group and hence no statistical testing could be completed between majors.

Prior Work Experience. Most of the students (205 or 67%) had not had prior work experience, while 134 or 33% had held jobs prior to enrolling in the university. In seven of the eight classes, there were two groups of participants based on work experiences.

Research Question One: Are there differences in the Ideal and Actual social environments of adult classrooms as perceived by the Chinese graduate students in technology class?

A series of paired t-tests were used to answer this research question. The ratings on the "ideal" form were compared to the ratings on the "actual" form. Each subscale was compared and the ttests were performed separately for each of the eight technology classes. The level of the students' satisfaction with the classroom environment is identified by the discrepancy between the scores of the actual and ideal classroom environment. A small discrepancy between the actual and ideal ratings represents a high level of satisfaction.

The differences between the ideal and actual classroom environment scores were significant on all nearly all subscales in each of the eight classes, where the ideal classroom environment was rated higher than the actual classroom environment. The largest differences between ideal and actual scores in Class One were on the Affiliation (M diff = 3.52) and Personal Goal Attainment (M diff = 3.42) subscales. In Class Two the largest differences in scores occurred on the Personal Goal Attainment (M diff = 6.88), Involvement (M diff = 6.59), Student Influence (M diff = 6.29), and Organization and Clarity (M diff = 5.76). The largest difference between scores in Class Three occurred on Personal Goal Attainment (M diff = 3.32) subscale. The differences were great within Class Four, where the ideal environment was scored much higher than the actual environment. There were great differences between ideal and actual scores in all the subscales: Organization and Clarity (M diff = 11.26), Involvement (M diff = 10.16), Student Influence (M diff = 10.15), Personal Goal Attainment (M diff = 9.95), Teacher Support (M diff = 8.68), Affiliation (M diff = 7.63), and Task Orientation (M diff = 4.94). The largest differences between the

ideal and actual scores in Class Five were on Affiliation (M diff = 4.95), Personal Goal Attainment (M diff = 4.57), and Organization and Clarity (M diff = 3.67). In Class Six, the largest differences occurred on Personal Goal Attainment (M diff = 6.95), Student Influence (M diff = 6.86), and Involvement (M diff = 6.38). The largest differences between the ideal and actual scores in Class Seven were on Organization and Clarity (M diff = 5.59), Involvement (M diff = 5.73), and Personal Goal Attainment (M diff = 5.00). Among those in Class Eight the largest differences between the two scores occurred on Affiliation (M diff = 5.12) and Involvement (M diff = 4.96). At the same time, the results also revealed that there were no differences between the ideal and actual scores in Classes Five and Seven on the Task Orientation subscale (t (20) =1.83; p = 0.082 in Class Five, and t (42) = 1.02; p = 0.053 in Class Seven).

The results that across most of the subscales and most of classes, the ideal learning environment was rated higher than the actual environment. It appears that the largest discrepancies between ideal and actual classroom environments are on the dimensions of Personal Goal Attainment and Affiliation. There does not seem to be as much discrepancy between actual and ideal scores in Task Orientation.

Research Question Two: Are there differences in the perceptions of the Chinese graduate students and those of the faculty regarding the social environment of adult technology classrooms?

The data analyses that address Research Question Two are shown in Tables 1 and 2. In these tables the differences between the scores of graduate students and the teacher in each class on the actual classroom environment scales are shown, along with the results of the t-test for paired samples. Each student was "assigned" the scores of his or her teacher. This score was "paired" with the student's score. Each of the seven subscales was tested for statistical significance.

The results are reported separately for each of the eight technology classes. The results for class 1 – 4 are shown in Table 9, and Table 10 gives the results for classes 5 – 8.

As shown in Table 9, the differences between the scores on the actual classroom environment rated by the Chinese graduate students and their teacher in each class were significant on most of the subscales in each of the

Table 1

DIFFERENCES IN STUDENTS' AND TEACHERS' RATINGS OF THE ACTUAL CLASSROOM ENVIRONMENT FOR CLASSES 1 - 4

	Class	Student		Teacher		Difference			
		M	SD	M	SD	M	SE	t	p
Involvement	1	20.78	2.90	20.00	0.00	-0.78	0.51	-1.52	0.138
	2	16.35	3.25	18.00	0.00	1.65	0.38	4.41	0.000
	3	20.48	2.63	22.00	0.00	1.52	0.29	5.20	0.000
	4	13.32	3.83	25.00	0.00	11.68	0.78	15.05	0.000
Affiliation	1	18.72	2.85	22.00	0.00	3.28	0.50	6.50	0.000
	2	17.33	2.64	16.00	0.00	-1.33	0.30	-4.38	0.000
	3	18.37	2.17	21.00	0.00	2.63	0.24	10.90	0.000
	4	15.21	2.49	19.00	0.00	3.79	0.57	6.65	0.000
Teacher Support	1	22.88	2.99	26.00	0.00	3.12	0.53	5.91	0.000
	2	17.48	3.15	23.00	0.00	5.52	0.36	15.17	0.000
	3	21.09	2.52	21.00	0.00	-0.09	0.28	-0.31	0.759
	4	15.16	2.32	24.00	0.00	8.84	0.53	16.64	0.000
Task Orientation	1	21.00	2.40	20.00	0.00	-1.00	0.42	-2.36	0.025
	2	17.96	2.41	24.00	0.00	6.04	0.28	21.73	0.000
	3	21.47	2.59	22.00	0.00	0.53	0.29	1.85	0.069
	4	17.84	1.92	24.00	0.00	6.16	0.44	13.96	0.000
Personal Goal Attainment	1	19.72	1.99	23.00	0.00	3.28	0.35	9.34	0.000
	2	15.63	2.56	20.00	0.00	4.37	0.30	14.81	0.000
	3	19.37	2.71	19.00	0.00	-0.37	0.30	-1.23	0.222
	4	12.74	2.84	19.00	0.00	6.26	0.65	9.60	0.000
Organization And Clarity	1	23.66	3.03	24.00	0.00	0.34	0.54	0.64	0.526
	2	17.89	2.81	26.00	0.00	8.10	0.32	25.01	0.000
	3	22.26	2.68	24.00	0.00	1.74	0.30	5.85	0.000
	4	14.42	3.44	26.00	0.00	11.58	0.79	14.68	0.000
Student Influence	1	18.84	2.45	20.00	0.00	1.16	0.43	2.67	0.012
	2	15.55	2.83	17.00	0.00	1.45	0.33	4.45	0.000
	3	19.00	2.20	20.00	0.00	1.00	0.24	4.10	0.000
	4	12.32	2.85	19.00	0.00	6.68	0.65	10.23	0.000

first four classes. In most of the cases, the teacher's scores of the actual classroom environment were higher than the graduate students' scores. The largest differences between the scores of the actual classroom environment given by the graduate students and the teacher in Class One were on the Affiliation (M diff = 3.28), Personal Goal Attainment (M diff = 3.28), and Teacher Support (M diff = 3.12)

subscales. In Class Two the largest differences in scores were on Organization and Clarity (M diff = 8.10), Task Orientation (M diff = 6.04), and Teacher Support (M diff = 5.52). The largest difference between the scores of the teacher and graduate students in Class Three was on Affiliation (M diff = 2.63). The differences on the scores of all subscales in Class Four were significant. The largest differences were on Involvement (M diff = 11.68), and Organization and Clarity (M diff = 11.58). The results in Table 1 also show that there were no significant differences on the Involvement (t (32) = -1.52; $p > 0.05$), and Organization and Clarity (t (32) = 0.64; $p > 0.05$) in class One, Teacher Support (t (80) = -0.31; $p > 0.05$), Task Orientation (t (80) = 1.85; $p > 0.05$), and Personal Goal Attainment (t (80) = -0.37; $p > 0.05$) in Class Three.

Table 2 shows the results of the t-tests for paired samples in classes 5 – 8. The differences between the scores of the teacher and graduate students were significant on most of the subscales in most of the classes. Most of the teacher scores were higher than the scores of the graduate students in questions about the actual classroom environment. The largest differences between the scores of the teacher and graduate students in Class Five were on Organization and Clarity (M diff = 5.10), Teacher Support (M diff = 3.76), and Affiliation (M diff = 3.38). In Class Six, the largest differences between the scores of the teacher and graduate students were on Student Influence (M diff = 3.76), and Affiliation (M diff = 3.33). The largest differences between the two sets of scores for Class Seven occurred on Organization and Clarity (M diff = 5.61), and Teacher Support (M diff = 4.30). In Class Eight the largest differences between the scores of the teacher and graduate students were on Organization and Clarity (M diff = 8.38), and Affiliation (M diff = 7.42). The results failed to reveal significant differences on Personal Goal Attainment (t (20) = -0.08; $p > 0.05$) and Student Influence (t (20) = -0.15; $p > 0.05$) in Class Five, and Student Influence (t (25) = 0.69; $p > 0.05$) in Class Eight.

Table 2

DIFFERENCES IN STUDENTS' AND TEACHERS' RATINGS OF THE ACTUAL CLASSROOM ENVIRONMENT FOR CLASSES 5 - 8

	Class	Student		Teacher		Difference			
		M	SD	M	SD	M	SE	t	p
Involvement	5	18.33	1.91	20.00	0.00	1.67	0.42	4.01	0.001
	6	18.00	1.67	21.00	0.00	3.00	0.37	8.22	0.000
	7	17.24	2.79	20.00	0.00	2.76	0.44	6.32	0.000
	8	18.23	2.41	25.00	0.00	6.77	0.47	14.35	0.000
Affiliation	5	17.62	1.83	21.00	0.00	3.38	0.40	8.47	0.000
	6	17.67	2.24	21.00	0.00	3.33	0.49	6.81	0.000
	7	16.80	2.37	19.00	0.00	2.20	0.37	5.93	0.000
	8	17.58	2.32	25.00	0.00	7.42	9.45	16.33	0.000
Teacher Support	5	19.24	2.59	23.00	0.00	3.76	0.56	6.66	0.000
	6	18.90	2.04	21.00	0.00	2.10	0.45	4.69	0.000
	7	18.70	2.75	23.00	0.00	4.30	0.43	10.00	0.000
	8	19.42	2.35	26.00	0.00	6.58	0.46	14.26	0.000
Task Orientation	5	19.24	1.64	21.00	0.00	1.76	0.36	4.92	0.000
	6	19.48	1.72	22.00	0.00	2.52	0.38	6.72	0.000
	7	19.90	2.73	22.00	0.00	2.10	0.43	4.93	0.000
	8	19.00	2.12	24.00	0.00	5.00	0.42	12.05	0.000
Personal Goal Attainment	5	18.04	2.84	18.00	0.00	-0.04	0.62	-0.08	0.939
	6	16.95	1.66	18.00	0.00	1.05	0.36	2.90	0.009
	7	17.37	2.99	20.00	0.00	2.63	0.47	5.64	0.000
	8	17.81	2.56	19.00	0.00	1.19	0.50	2.37	0.026
Organization And Clarity	5	19.90	1.81	25.00	0.00	5.10	0.40	12.87	0.000
	6	19.76	1.45	21.00	0.00	1.23	0.32	3.92	0.001
	7	18.39	3.14	24.00	0.00	5.61	0.49	11.45	0.000
	8	19.62	2.87	28.00	0.00	8.38	0.56	14.89	0.000
Student Influence	5	18.10	2.83	18.00	0.00	-0.10	0.62	-0.15	0.879
	6	17.24	2.28	22.00	0.00	4.76	0.50	9.58	0.000
	7	16.98	1.80	16.00	0.00	-0.98	0.28	-3.48	0.001
	8	17.65	2.56	18.00	0.00	0.35	0.50	0.69	0.497

Results shown in Tables 1and 2 indicate that the scores of the teacher were higher than the scores of graduate students in most of the subscales, although there were no significant differences were shown in a few dimensions in a few classes, and even a few of the scores of graduate students were higher than the scores of the teacher in some subscales. The largest discrepancies between the scores

of the teacher and graduate students on the actual classroom environment were in the dimensions of Organization and Clarity, and Teacher Support.

Research Question Three: Are there differences between the Chinese graduate students in two age groups in their perceptions of the social environment of adult technology classrooms?

In two of the eight classes there was only one group of graduate students, either all older than 25 or younger than 26: therefore, the data analyses only covered the data from six classes. In the other six classes, scores of the graduate students older than 25 and those younger than 26 were compared on the "actual" classroom environment subscales, using a one-way ANOVA.

The scores of the younger and older graduate students on the actual classroom environment were only significantly different on one subscale in one class; a significant difference between the scores of the younger (M=18.23) and older graduate students (M=15.50) on the actual classroom environment occurred on Personal Goal Attainment (F (1, 24) = 4.35; p = 0.048) in Class Eight . In the remainder of the comparisons, there were no differences. The results indicate that across all of the subscales and all six classes, the scores of the younger graduate students are not significantly different from the scores of the older graduate students, with an exception of one subscale in one class.

Research Question Four: Are there differences between the male and female Chinese graduate students in their perceptions of the actual social environment of adult technology classrooms?

While the complete tables are not shown here, the analysis revealed that there were no differences between the scores of the male and female students in most of the subscales. The scores of the male and female students were significantly different in a few subscales: the Personal Goal Attainment (F (1, 31) = 5.21; $p < 0.05$) and Organization and Clarity (F (1, 31) = 8.22; $p < 0.05$) subscales in Class One; Task Orientation (F (1, 73) = 5.21; $p < 0.05$) and Organization and Clarity (F (1, 73) = 14.20; $p < 0.05$) in Class Two; Involvement (F (1, 17) = 4.82; $p < 0.05$), Personal Goal Attainment (F (1, 17) = 12.46; $p < 0.05$), Organization and Clarity (F (1, 17) = 6.35; $p < 0.05$), and Student Influence (F (1, 17) = 11.50; $p < 0.05$) in Class Four. Significant differences between the scores of the male and female graduate students in Class Seven did occur on Involvement (F (1, 39) = 4.63; $p < 0.05$), and Affiliation (F

(1, 39) = 4.13; $p < 0.05$). The results indicate that on most of the subscales and in most of classes, ifferences between the scores of male and female graduate students were not significant, though significant differences occurred in a few subscales and in a few classes

Research Question Five: Are there differences between the Chinese graduate students of science and liberal arts majors in their perceptions of the social environment of adult technology classrooms?

While the complete tables are not shown given, there were only four classes out of eight in which there graduate students of both majors. The differences between the scores of the graduate students of two different majors of the actual classroom environment were not significant in most of the subscales and in most of classes. However, a significant difference between the scores of graduate students of two different majors in Class One occurred on the Personal Goal Attainment (F (1, 31) = 4.47; $p < 0.05$) subscale.

Research Question Six: Are there differences between the graduate students who have work experiences and those who do not have any work experiences in their views about the social environment of adult technology classrooms?

While the complete tables are not shown, there were seven classes with students who had work experience. There were no significant differences on any subscales between the scores of graduate students with and without work experiences, with the exception on Task Orientation (F (1, 19) = 4.52; $p < 0.05$) subscale in Class Three.

Research Question Seven: Are there differences between the Chinese graduate students and teachers and American students and teachers in their views about the social environment of adult classrooms?

The data analyses that address Research Question Seven are shown in Tables 3 through 5. The data used in the analyses were from two other studies by Darkenwald (1987) and Bartholomay (1994). The ACES was used as the instrument in both studies. In Darkenwald's study (1987), the

participants were from three sites, one community college, one state university, and a community adult school. There were 355 students who completed Form A and 375 Form I. There were 46 instructors who completed Form A. In Bartholomay's study (1994), the participants were 2248 students and 109 instructors from remedial/developmental studies courses from community college campuses in the Virginia Community College System. In these tables the differences between the means of the scores of the Chinese graduate students and American students on the actual and ideal classroom environment, and the means of the scores of the Chinese teachers and American teachers on the actual classroom environment are shown. The results for student scores on actual classroom environment are shown in Table 3, the results for student scores on the ideal classroom environment are shown in Table 4, and the results for teacher scores on actual classroom environment are shown in Table 5.

Table 3

DIFFERENCES IN RATINGS OF CHINESE STUDENTS AND AMERICAN STUDENTS OF THE ACTUAL CLASSROOM ENVIRONMENT

	Chinese Students@		American Students@ Darkenwald(1987)			American Students@ Bartholomay(1994)		
	M	SD	M***	SD**	t	M	SD	t
Involvement	17.83	2.05	22.20	2.05	-27.59*	19.85	3.24	-10.77*
Affiliation	17.40	2.61	21.00	2.61	-19.99*	19.86	2.96	-14.01*
Teacher Support	19.11	2.59	23.40	2.59	-21.43*	22.86	3.40	-18.84*
Task Orientation	19.48	2.19	22.50	2.19	-17.85*	20.91	2.65	-9.15*
Personal Goal Attainment	17.48	2.42	20.60	2.42	-16.68*	18.29	2.92	-4.70*
Organization and Clarity	19.48	2.66	22.60	2.66	-15.18*	22.41	3.20	-15.50*
Student Influence	16.91	2.45	20.60	2.45	-24.85*	16.84	2.81	0.42

*$p < .05$

**Note. Since standard deviations were not reported in Darkenwald's study, estimates are based on the current study.

***Note. Estimates were obtained from a graph published in Darkenwald's study.

@Note. The sample sizes used in these calculations were as follows; current study n=317, Darkenwald n=355, Bartholomay n ranged from 1923 to 2131, depending on the scale.

As shown in Table 3, the differences between the means of the scores of the Chinese students and American students were significant on most of subscales. The means of the scores in Darkenwald's study (1987) were the highest, the means of the scores in Bartholomay's study were in the middle, and the means of the scores of Chinese students were the lowest. In all cases the means of the scores in Darkenwald's study (1987) were higher than the means of the Chinese students' scores, and in six of seven subscales, the means of the scores in Bartholomay's study (1994) were higher than the means of the Chinese students' scores. Thus, it appears the means of the American students were higher than the means of the Chinese students on the actual classroom environment, with the largest discrepancies being on the dimensions of Involvement, Affiliation and Teacher Support.

Table 4

DIFFERENCES IN RATINGS OF CHINESE STUDENTS AND AMERICAN STUDENTS OF THE IDEAL CLASSROOM ENVIRONMENT

	Chinese Students@		American Students@					
			Darkenwald(1987)			Bartholomay(1994)		
	M	SD	M***	SD**	t	M	SD	t
Involvement	23.24	2.61	23.70	2.61	-2.31*	22.23	3.57	4.84*
Affiliation	22.24	2.64	21.90	2.64	1.69	21.46	3.05	4.32*
Teacher Support	23.42	2.66	23.90	2.66	-2.34*	23.71	3.60	-1.38
Task Orientation	21.81	2.59	23.30	2.59	-7.54*	20.80	2.82	6.01*
Personal Goal Attainment	22.53	2.61	21.50	2.61	5.17*	20.75	3.31	9.16*
Organization and Clarity	24.01	2.77	24.20	2.77	-0.89	23.23	3.50	3.79*
Student Influence	22.00	2.62	21.40	2.62	3.00*	18.97	3.14	16.27*

*p < .05

**Note. Since standard deviations were not reported in Darkenwald's study, estimates are based on the current study.

***Note. Estimates were obtained from a graph published in Darkenwald's study.

@Note. The sample sizes used in these calculations were as follows; current study n=317, Darkenwald n=355, Bartholomay n ranged from 1923 to 2131, depending on the scale.

In Table 4, the results of comparisons show no significant differences between the means of the scores of the Chinese and American students in three of the subscales on ideal classroom environment. It is interesting to note that Chinese students had higher scores on many of the subscales than students in the Bartholomay study. The largest differences between the means of the Chinese and American students were on the Personal Goal Attainment and Student Influence subscales.

Table 5

DIFFERENCES IN RATINGS OF CHINESE TEACHERS AND AMERICAN TEACHERS OF THE ACTUAL CLASSROOM ENVIRONMENT

	Chinese Teachers@		American Teachers@ Darkenwald(1987)			American Teachers@ Bartholomay(1994)		
	M	SD	M***	SD**	t	M	SD	t
Involvement	21.38	1.19	23.10	1.19	-2.36*	20.91	2.70	0.49
Affiliation	20.50	1.26	22.30	1.26	-3.73*	21.21	2.70	-0.74
Teacher Support	23.38	1.33	25.40	1.33	-3.96*	25.85	2.40	-2.87*
Task Orientation	22.38	1.57	22.50	1.57	-0.20	22.47	2.25	-0.11
Personal Goal Attainment	19.50	1.57	21.10	1.57	-2.66*	18.89	3.55	0.48
Organization and Clarity	24.75	0.92	23.90	0.92	2.41*	24.73	2.62	0.02
Student Influence	18.75	0.95	20.70	0.95	-5.36*	16.30	2.88	2.39*

*$p < .05$
**Note. Since standard deviations were not reported in Darkenwald's study, estimates are based on the current study.
***Note. Estimates were obtained from a graph published in Darkenwald's study.
@Note. The sample sizes used in these calculations were as follows; current study n=8, Darkenwald n=46, Bartholomay n ranged from 110 to 113, depending on the scale.

As shown Table 5, the differences between the means of the scores of the Chinese and American teachers on the actual classroom environment were significant in six of the seven subscales in the Darkenwald comparison, and in two of the seven subscales in the Bartholomay comparison. Across both comparisons, means of the American teachers were higher than the means of the Chinese teachers on

the Teacher Support subscale. The Chinese teacher rated higher on the Student Influence subscale than the teachers in Bartholomay study.

DISCUSSION

Using a definition that identifies satisfaction with a course as the discrepency in scores between actual and ideal classroom ratings, it appears the students in this study were not satisfied with their classroom learning environments, since all of the actual-to-ideal comparisons were significantly different, with the ideal scores being higher. There was variation, however, as some "gaps" between "actual" and "ideal" ratings were larger than others. While there were differences between specific classes, it appears that students were more satisfied (i.e., less dissatisfied) with the organization and clarity of the classrooms, teacher support, and the task orientation, while being less satisfied (more dissatisfied) with the affiliation, personal goal orientation, involvement, and student influence. As might be expected, however, the differences were not consistent across classes or institutions. Generally speaking, the graduate students in Classes One and Three were more satisfied (i.e., less dissatisfied) with most of the dimensions in their actual classroom environment, while students in Classes Two and Four were less satisfied (more dissatisfied) with their actual classroom environment. Classes One and Three were from a large key university and a small key university, Class Two was from a large key university, and Class Four was from a small regular university. Therefore graduate student satisfaction did not appear to be related to the size or "type" of a university but was probably more related to teacher personality, teaching styles, their own technology, and their sense of responsibility. The results were quite similar to those of Darkenwald's (1989) study. However, in each dimension the Chinese graduate students rated the actual classroom environment lower than their American counterparts (Darkenwald, 1987, 1989; Bartholomay, 1994). This finding suggested that the American students were more satisfied with their actual classroom environment than were the Chinese graduate students with theirs.

Teachers also perceived Organization and Clarity and Teacher Support as the most important elements in the actual classroom environment; they identified Personal Goal Attainment and Student Influence as the least important. However, there were significant differences between the perceptions of the teachers and the graduate students in each class about the actual classroom environment. Teachers perceived their classroom environments as much more positive than did their students, in fact even more

so than the students' ratings of what the "ideal" classroom should be like. In this aspect, the results were similar to the results obtained in Darkenwald's (1989, 1987) studies and Bartholomay's (1994) study. American teachers (Darkenwald, 1987, 1989) perceived Involvement, Affiliation, Teacher Support, Student Influence and Personal Goal Attainment as more characteristic of their classroom environments than did the Chinese teachers in this study.

Generally speaking, female and male graduate students did not differ in their perceptions of the actual classroom environment. However, the analyses showed significant differences between the perceptions of the female and male graduate students on a few dimensions: Organization and Clarity, and Personal Goal Attainment in two classes, Organization and Clarity in another class, and Involvement and Affiliation in another class. Female graduate students did rate many of the dimensions lower, although the differences were not always statistically significant. This result was similar in pattern to that of Beer and Darkenwald's study (1989) which provided empirical evidence that female and male adult learners have different perceptions of the college classroom environment, though those differences were not large.

The comparison of the perceptions of participants in subgroups based on age, major or work experience did not show any major differences. The graduate students in the two age groups in each class all ranked the dimensions of classroom environments in the sequential order from high to low: Organization and Clarity, Task Orientation, Teacher Support, Involvement, Personal Goal Attainment, Student Influence and Affiliation. This result is similar to the result of Darkenwald's (1987) study, which showed that age was unrelated to any of the ACES dimensions. In this study, no significant differences were found between the perceptions of the graduate students in two different majors, science and liberal arts. Students in both majors conceived Organization and Clarity, Task Orientation and Teacher Support as more characteristic than Involvement, Personal Goal Attainment, Student Influence, and Affiliation. Likewise there were no significant differences in the perceptions of the participants with and without work experience. Both groups considered Organization and Clarity, Task Orientation, and Teacher Support as the most important elements, Involvement, and Personal Goal Attainment less important, and Affiliation and Student Influence least important.

Across all courses there were discrepancies between ratings of the ideal and actual classroom environment. Discrepancies could also be found between the perceptions of the teacher and graduate students in each class, where teachers generally held higher opinions of the social environment of their classrooms than did their students. The perceptions of the Chinese students in this study concerning the ideal classroom environment were quite similar to those of the American students in Darkenwald's studies (1987, 1989). However, the Chinese students had much lower opinions of the actual classroom than the American students did in Darkenwald's studies (1987, 1989). Likewise, Chinese faculty perceptions of the actual classroom environments were very different from the American faculty. The Chinese faculty rated Student Influence and Personal Goal Attainment much lower. These findings suggest that the Chinese graduate classroom is still more teacher-centered than the American classroom. Chinese teachers do not appear to be as concerned with students' influence in their classrooms, and they are more concerned with the group than with individuals.

An additional finding suggested that gender was a noteworthy factor in teaching and learning. The female graduate students in China emphasized dimensions different from those important to the female college students in America (Beer, & Darkenwald, 1989). The femail students from China needed more Organization and Clarity and Personal Goal Attainment, while the American female students more highly valued Affiliation and Involvement.

Further research is needed on cross-cultural differences in university learning environments. The results of this study indicate that the adult classroom learning environment is a concept that is viable in other cultural contexts. Generally, this study successfully identified the factors that led to satisfaction of the graduate students and revealed their needs in classroom environments of technology courses in China. It therefore contributes a unique perspective for teachers and administrators in China. Further, this study demonstrated the usefulness of the Adult Classroom Environment Scale in measuring variability in graduate students' perceptions of their classroom environments in Chinese Universities. Future studies might include comparisons between the perceptions of Chinese adult learners and American adult learners in the same kind of courses or between Chinese adult students who study in China and who study in the United States. Further research is also needed to identify other possible dimensions of the classroom environment that might not be measured with the ACES instrument.

Additional studies should be completed in China, in different courses, different institutional settings, and with different subgroups of participants who have different motivations, to identify those important aspects of the adult classroom environment within the Chinese culture in an effort to enhance learning experiences in higher education.

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